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Observations on Fowl Paralysis and Some Current Conditions in Poultry Problems*

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In this address I propose to discuss some of the conditions we are meeting under present circumstances and to say something about fowl paralysis. Before commencing, however, I would draw your attention to a very important aspect of disease and disease prevention which has been almost completely neglected in this country. I refer to the production of breeds or strains of fowls resistant to disease. In the past great strides have been made in producing fowls with considerable variation in the type of comb, wattles, body size, shape and colour, and egg production has been increased enormously by selection, but little or no attention has been given to the inheritance of resistance to disease. A good deal of work has been done along these lines in America, and considerable improvements have resulted in experimental flocks in the short space of a few generations. In this country, Dr. Greenwood, of the Institute of Animal Genetics, has developed a line of Brown Leghorns resistant to the Rous sarcoma. In these birds the tumour either fails to grow or shows very slight growth followed by regression. In-breeding of carefully selected progeny-tested stock is the method adopted in this type of work. It may not be possible for the individual farmer to do more than follow the broad principle, but the institution of a central stud farm for the production of male birds carrying a high degree of immunity and livability would be of inestimable benefit to the poultry industry as a source of fresh blood when such was required. It would seem to be a line of research well worth developing and one of great possibilities. This aspect will be dealt with more specifically in connection with fowl paralysis.

When one considers the present position of poultry disease as a whole one would say that there has been an increase in non-specific diseases of young chicks, in Salmonella infections of young chicks, and a fairly large number of outbreaks of chronic coccidiosis have been encountered in growing stock. These findings are possibly associated with the difficulties of feeding adequate diets under war-time conditions, necessitating the use of substitute foods and other constituents foreign to peace-time practice. There would appear to be fewer outbreaks of fowl paralysis and the general health of the poultry stocks is probably better, due to the drastic culling necessitated by food shortage, leading to the elimination of the unthrifty and of the poor producers from flocks throughout the country.

"SIX-DAY CHICK DISEASE"

A high mortality towards the end of the first week of life was noted in certain flocks during the rearing season of 1943 and during 1944 this condition might be said to have become widespread and complaints were received from all districts.

In 1943 we experienced a very bad outbreak in a farm with which we have been acquainted for many years and which was considered for practical purposes as disease free. Losses commenced on the fifth and sixth day and continued at a high level to the ninth day with odd cases during the next few days. No significant symptoms were noted. A similar happening occurred in each successive hatch, and after about 14 days losses always stopped and the survivors had the appearance of normal chicks and reared uneventfully. It is interesting to note, however, that the resultant pullets were all very late in coming into production. The mortality was in the region of 40 per cent.

The most striking feature at *post-mortem* examination was a marked distension of the gall bladder—in some cases it was enormous. The gizzard in most cases contained a large amount of food material which appeared to consist mainly of husks and there was always evidence of indigestion. As the mash in use was an experimental one, a feeding experiment was carried out at Eskgrove using a different strain of chicks and similar results were obtained. The food was analysed and was found to contain a high percentage of fibre (12·3). It is interesting to note that chickens from two to three weeks onwards progressed quite well on this food. Immediate improvement was noted when the mash was changed to a previous formula and no further outbreaks occurred in succeeding hatches.

A few isolated outbreaks were encountered during last season, but the total losses involved were not large.

In 1944 widespread outbreaks were encountered and considerable prominence was given to the "disease" in the poultry and ordinary press and the term "Six-day chick disease" was coined. The cause has not yet been ascertained, but it seems certain that it is nutritional, and that the disease will disappear when a return to peace-time feeding is possible. A common observation that the addition of any nutritious food material, *e.g.*, kibbled grain, dried milk, cheese waste or some similar ingredient to the mash prevents further losses would appear to support the theory of dietetic origin. It has been said that the use of unpalatable constituents of the mash plays a part, and while it cannot be denied that this might be a cause of non-specific mortality in chicks, it does not appear to be so in the present case as usually chicks eat well until just before death.

Whalley Taylor (1944), from experiments he had carried out at the Experimental Poultry Farm of the Poultry Association of Great Britain, has stated that the feeding of mash containing more than 10 per cent. of palm kernel meal causes a high mortality in young chicks and believed this to be the cause of six-day chick disease, but we have been unable to confirm this from our experiments.

Professor Robertson, of the Animal Husbandry Department of the Royal (Dick) Veterinary College, has analysed a number of mashes in use where an unduly high and otherwise inexplicable mortality resulted and a high percentage of fibre has been present in some cases; this would seem a very probable cause in these instances. Further work is proceeding on these lines, and it is hoped to publish the results shortly.

While there is no doubt that a very high mortality has been due to this condition, it is certain that, as with all "popular" diseases, losses have been exaggerated and that deaths occurring in young chicks from many causes, including errors in feeding and brooding, have been wrongly attributed to six-day chick disease.

SALMONELLA INFECTIONS

It is not suggested that war-time feeding is solely responsible for the increase in Salmonella infection in chicks and adult fowls, but the necessity for using swill, bakers' waste and other material which might contain egg products or which might be contaminated with other Salmonellas associated with food poisoning, must, of necessity, increase the risk of acquiring infection.

We have encountered several outbreaks of bacillary white diarrhoea in adult stock caused by the feeding of improperly sterilised "clear" eggs from the incubator. It can be appreciated that an infertile egg infected with *S. pullorum* after several days' incubation must have a high germ content, and what is virtually a pure culture of *S. pullorum* is being fed to the hens. Even where deaths do not occur, agglutinins are formed, and as many as 90 per cent. of the adult stock may react at the next flock test.

It is well known that outbreaks of disease in ducklings due to *S. aertrycke* and *S. enteritidis gaertner* are fairly common, but it should not be forgotten that chicks are also susceptible, and during the past season a considerable increase in such infections has been encountered. Infection with *S. thompson* has also occurred frequently. It is not possible to determine the proportion of outbreaks attributable to the use of contaminated ingredients in the mash as supplied to the poultry farmer, but in some cases we have investigated, contamination has occurred on the premises, and this should be preventable. Rats and mice are frequent carriers of *S. enteritidis gaertner, S. aertrycke* and *S. thompson*, and the importance of keeping food in rat- and mouse-proof containers and the control of these vermin in the brooder houses cannot be over-emphasised.

In one outbreak causing very heavy losses, *S. thompson* was present in some chicks and *S. aertrycke* in others. Dual infection was also noted. A few years ago, on this farm, following losses due to *S. aertrycke* infection, rat- and mouth-proof bins were provided, and for several years no losses had occurred. On investigation of the recent outbreak it was found that dried milk which was obtained in sealed bags contained mouse faeces, and from these *S. aertrycke* was isolated. There were mouse holes in the brooder house and from mice caught there we were able to isolate *S. thompson*.

This case illustrates the complete control of vermin which is necessary, especially where chick rearing is carried on on a large

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scale, if serious losses are to be avoided, as, although adequate steps had been taken to protect the mixed food, one ingredient had been contaminated before receipt, and there was also infection of final product within the feeding troughs.

The use of rat poisons, the lethal basis of which is a live culture, as a general rule is to be deprecated. It should also be remembered that rat pastes containing phosphorus, barium and zinc should be used with extreme care, as poisoning of poultry by this means is not uncommon.

In dealing with losses in young chicks it must be pointed out that in every case a bacteriological examination should be carried out before a definite diagnosis can be established. Even where such obvious conditions as rickets or acute caecal coccidiosis are present, this rule should be followed.

In this connection it is always advisable to send several chicks, and most laboratories realise that the examination of a single chick is unsatisfactory and have fixed a fee which covers the examination of the number of chicks necessary for a diagnosis.

Dead chicks should be sent for preference, but if none is available, obviously affected specimens should be chosen. They should be packed in a tin or cardboard box. The common methods of putting them in a large envelope or wrapping in a paper parcel are very unsatisfactory, as the bodies, thus treated, frequently arrive in a squashed condition, detrimental to proper examination.

Fowl Paralysis

As you are all aware, this disease has caused very considerable losses throughout this and other countries during the past years, and a great deal of research work has been done. It can be claimed that much knowledge of the disease has been accumulated and considerable light has been shown on its aetiology, method of spread and control.

You will recall that although the disease was first recorded in 1878 (May, *et. al.*, 1925) and had caused considerable losses in America, it was not reported in this country until 1929, by Galloway.

Although it is certain that losses have been exaggerated it has been responsible for high mortality and wastage.

In Scotland we did not have a case until 1931 when four fowls out of 483 examined were found to be affected. Table No. 1 shows the number of cases diagnosed during routine *post-mortem* examinations of fowls from various parts of Scotland.

Table I

Year	No. of Birds Examined	No. of Cases of Fowl Paralysis	Percentage
1.4.31–31.3.32	483	4	0·83
1932–33	624	7	1·12
1933–34	966	92	9·66
1934–35	1,016	126	12·40
1935–36	1,356	172	12·63
1936–37	2,667	427	16·01
1937–38	2,955	379	12·52
1938–39	1,346	217	16·12

At the Egg Laying Test controlled by the Department of Agriculture for Scotland at Seafield, a similar state of affairs can be seen from Table No. II.

Table II

Year	Number of Pullets	Number of Deaths	Percentage Mortality	Number of Cases of Fowl Paralysis	Percentage Affected with Fowl Paralysis
1933–34	495	91	14·2	3	3·3
1934–35	492	102	17·3	14	13·7
1935–36	553	136	19·5	28	20·0
1936–37	450	106	19·6	28	26·0
1937–38	432	61	14·2	15	24·0
1938–39	425	99	19·4	19	19·0

It will be noted that the disease did not occur until 1933, but from 1935 until the tests terminated in 1939 it was the greatest single cause of death.

Coincidental with the spread of fowl paralysis, there was a marked increase in the total mortality rate from all causes. Thus at the Harper Adams Egg Laying Test mortality rose from 5·2 per cent. in 1925 to over 20 per cent. in 1936, and at Seafield it rose from 6·5 per cent. in 1927 to over 19 per cent. in 1935, 1936, 1937, 1938 and 1939. The position was even worse in America where very high figures were quoted. It can be appreciated that a 20 per cent. mortality in fowls during the pullet year when added to losses during rearing and wastage due to increase of age, necessitating culling at the cessation of the period of economic egg production, represented an enormous loss to the industry.

The position on individual farms varied considerably. At the Duthie Experimental Farm, which participated in our Survey and provided invaluable research material, in 1933 the mortality during the pullet year was about 12 per cent. with an average egg production of 186. In 1935, the mortality of comparable birds was 77·5 and egg production had dropped to 63. In some farms losses were said to be small but probably few escaped completely.

The histories obtained by sending out questionnaires to all farms where the disease was diagnosed were conflicting. In some cases a single breed only was affected, whereas in others several breeds, or all breeds, appeared to be involved. In some cases chicks reared well at home but did badly at purchasers' premises and *vice versa*.

By 1937 cases had been received from almost every county in Scotland, and the disease had been encountered in all the common breeds and also in the less popular breeds, such as Old English Game. I met with the disease in 1937 in several breeds of bantams, and in 1939 in an Upland goose and in a turkey. Glover (1940) also recorded the disease in a turkey and Harris (1939) reported an experimental case in a pheasant.

Cause.—The history of the disease with its sudden appearance and quick spread in the poultry flocks throughout this and other countries with a peak period, followed by a decline, with sporadic outbreaks in individual farms, is inconsistent with anything but an infectious disease.

It seems certain that the disease is due to a filter-passing virus, and many investigators have reported successful transmission following injections with material from diseased birds. Blakemore at Cambridge and Asplin (1944) at Weybridge have described an acute condition in young chicks following the injection of infective material, and Glover (1940) has reported similar results with material from a turkey. I have not encountered this acute disease of young chicks under natural conditions, nor was I able to set up the disease in Brown Leghorn chicks by injection of material supplied by Blakemore. None of the chicks used in our experiments has ever shown the lesions described by these workers, but our aim here has been to reproduce the classical features of the chronic disease as evidenced by nerve involvement and tumour formation. We have been successful in this in many experiments since 1939 and have produced the disease in fowls and bantams following the injection of fertile eggs and young chicks with suspensions of diseased nerve and tumour material in a crude state and filtered. We have also been successful in re-transmitting the disease from artificially infected birds. In some batches of injected chicks the incidence has been low and in some lots no positive cases resulted. We have found the incubation period to vary from four to five weeks to more than a year, but whether this period is short or long in most batches it has been usual for several birds to show symptoms within a few days of each other, and it is interesting to record that on three occasions during 1937 we diagnosed cases of fowl paralysis in pens at the Seafield Egg Laying Test and in sister pullets from the home flock almost simultaneously.

A method for concentrating the virus which has proved very successful in the transmission of Rous sarcoma was found to be useless in this disease.

There has been considerable doubt regarding the possibility of egg transmission and infection by contact either direct or indirect, but I think it is certain that all three methods play a part. Possibly the first method is the means of introducing the disease to fresh premises in many cases, but I think the others are more important in the spread of infection throughout the flock.

It has been amply demonstrated that certain strains are more resistant than others, but this will be discussed more fully later.

It has been shown by Warrack and Dalling (1932) and others that individual females in the flock may play a large part in producing susceptible offspring. In this connection Hutt (1939) cites a case where 10 out of 15 pullets from a single hen succumbed to the disease, while a full sister produced 17 pullets which remained healthy during the period of observation. Waters and Prickett (1944) have also confirmed these findings.

Care must be exercised, however, in classifying flocks or strains as resistant as it may be that apparent resistance is due to lack of exposure to infection or that the degree of infection present is too slight to produce clinical cases. For example, we believed that Dr. Greenwood's Brown Leghorns were very resistant, yet when introduced to infected premises and placed in contact with clinical cases as day-olds, they went down to almost the same extent as the home-bred chicks.

Methods of Transmission.—The observations of many workers suggest that egg transmission occurs. Many at first thought that no actual causative agent was transmitted but rather some hereditary predisposition to the disease. Even where egg transmission takes

place, as I said previously, I do not think that it is the chief means of spread. That carriers do exist seems indisputable, and their presence in an infected flock can be readily understood. Many affected birds may have several nerves and organs involved, others may have the disease confined to a single nerve. Clinical symptoms depend on the site and type of lesions. Where peripheral nerves, such as sciatic or brachial, are affected, the fowl would, in all probability, be culled. On the other hand, if the infection is confined to the vagi, splanchnic, hypogastric or intercostal nerves or takes the form of tumour formation, suspicious symptoms might not be noted, and such birds probably represent a potent method of spread of the disease.

That this hypothesis is tenable, is shown by the results of the *post-mortem* examination of 100 apparently healthy pullets, survivors of an outbreak. In ten birds, what were considered to be typical lesions were demonstrated. (Johnston and Wilson, 1939). It is possible that had the birds been kept under observation for a longer period a proportion might have become clinical cases, but it seems likely that in some the disease was latent and that these birds were potential "carriers."

There is now ample evidence that the disease can be spread by contact. Following the serious losses at the Duthie Farm of the Rowett Research Institute in 1934 very stringent hygienic measures were taken in 1935. Chicks were reared in the parent colony until they were eight weeks old and then put on clean ground and in fresh houses, but again losses were heavy. The following year the eggs from the same breeding stock were divided into two lots and each treated quite differently. One half was incubated on separate premises and reared from day-old on clean ground, and at the end of ten months the total mortality was 4·59 and 0·89 due to fowl paralysis. The remainder were reared on the infected premises, and the total mortality was 36·7 per cent. with 14 per cent. due to fowl paralysis. The average weight at six months was 3·87 and 3·24 lb. respectively. The experiment was carried on for a period of two years, and at the end of that time the total mortality on the clean ground was 20·9 with 1·1 fowl paralysis, compared to a total mortality in the controls of 76·8, of which 31·4 was due to fowl paralysis. The average egg production was 217·3 and 75·1 respectively. These figures showed how it was possible to reduce the incidence of the disease to negligible proportions by rearing on clean ground from the day-old stage. The age at which isolation commences is significant in view of the failure during a previous attempt when the commencing age was eight weeks. In the following year the experiment was repeated, and an attempt was made to obtain complete isolation by means of two specially designed houses. Two strains of fowls were used—Dr. Greenwood's Brown Leghorns and Duthie White Leghorns. Isolation broke down as coccidia were ultimately found in the faeces during routine examination. Nevertheless, the results detailed in Table III were clearly significant.

Cases developed much later in the isolated groups which were coccidia free for at least four months.

Table III

	Total Mortality.	Mortality Due to Fowl Paralysis
Isolation—Brown Leghorn ..	3·05	0·76
White „ ..	12·02	4·7
Parent Colony—Brown Leghorn ..	7·45	3·3
White „ ..	17·93	10·87

These experiments clearly show that isolation was effective in reducing the incidence of neurolymphomatosis and postponing its onset, and suggested that it was caused by an infective agent.

We have also shown at Eskgrove that when young chicks are reared on ground recently occupied by affected fowls a high percentage develop fowl paralysis. In an early experiment 13 out of 24 day-old chicks so exposed succumbed to the disease, showing typical nerve lesions. No cases occurred in control groups reared elsewhere.

During the present season 40 chicks (Brown Leghorn Females x Rhode Island Red/Light Sussex Male) were reared on the pen which had been vacant during the winter and spring. Between the 75th and 78th day four typical cases of fowl paralysis developed, and up to the present a total of eight cases have been diagnosed. The chicks are now 154 days old, so that presumably more may yet become affected. In every case duodenal coccidiosis has been present and deaths have also occurred from this disease. A control pen, full sisters to the affected birds, has been kept in isolation elsewhere. They also became affected with coccidiosis about the same time, but no cases of fowl paralysis have occurred.

Role of Internal Parasites.—The close connection between fowl paralysis and internal parasitism, especially coccidiosis, has been noted by all who are acquainted with the disease. It has been shown by Dalling and Warrack (1936) and other workers, and we have also noted that fowl paralysis can develop in birds kept intensively and apparently free from coccidia, at least as judged by regular routine examination of faeces during life and at the time of death, but in very many cases coccidiosis and neurolymphomatosis co-exist. In our paper reporting the results of the Duthie experiment, we stated that this connection was very striking and we recorded that no case of fowl paralysis was ever diagnosed in any group prior to the demonstration of coccidia in that group. In the isolated groups which suffered low mortality, coccidia were not demonstrated by examination of the faeces during the first four months, and the first case of fowl paralysis to develop in the Brown Leghorns in isolation was 76 days after finding coccidia in the droppings.

Our recent experiments suggest the possibility that the infective agent may be "carried" by coccidial oöcysts and this seems a possible method of survival of the virus in pens and runs which have been unoccupied for some time and might also explain the rapid spread of the disease which often occurs after infection is first introduced to a farm. The part played by coccidia may also give rise to misinterpretation of experimental results as it has been shown that even under the best methods of isolation it is almost impossible to keep a stock coccidia-free for the somewhat lengthy period necessary for work with this disease.

Waters (1944), who attempted to develop families of chicks free from lymphomatosis, pointed out that in preliminary experiments the most exacting quarantine and sanitary measures failed to prevent a high incidence of lymphomatosis and coccidiosis. He was able later to show that by stricter isolation families could be reared free from fowl paralysis whereas their sibs in contact with the outside population developed the disease. Under the same conditions of strict isolation the disease occurred in chicks hatched from "progeny infected" dams, indicating egg transmission. Their sibs, reared under exposed conditions, showed an incidence twice as great, indicating egg transmission plus infection by contact.

Prevention.—The importance of clean ground for chick rearing can scarcely be overestimated as it is in the first few weeks of life that infection is most readily acquired, even although symptoms may not develop until many months later. All contact with adult fowls during the first six to eight weeks should be avoided and careful attention should be paid to hygiene during that period. If fresh ground is not available, intensive rearing should be substituted. This is not a popular method with many breeders, but we have shown experimentally that in a farm where fresh ground was not available by adopting this method the total mortality and losses due to fowl paralysis were very materially decreased. We have also shown that birds reared intensively are able to stand up to the conditions prevalent in the average farm when so exposed later in life.

As stated earlier in this paper, it is now well known that certain strains of fowls are resistant to fowl paralysis and since Asmundson and Biely (1932) reported that resistance was inherited, this aspect of the disease has received considerable attention, mostly from American workers. Hutt *et al.* (1941) have shown, by selecting breeders from fowls whose offspring showed no evidence of neoplasms or neurolymphomatosis, that in four generations it was possible to reduce the total mortality rate from 64 per cent. to 38 per cent. (fowl paralysis 12 per cent.). By selection of susceptible families the total mortality rate was maintained at 61 per cent. (fowl paralysis 26 per cent.). These figures may appear unduly high, but it must be remembered that mortality figures generally are higher in America and also that in this series of experiments the fowls were exposed to disease and no culling was carried out.

In the resistant strain, body size, egg size and capacity to lay were all increased.

During the experiment some of the pullets of the resistant strain were crossed with males from a strain specially bred for viability and a remarkable reduction in mortality was obtained in the offspring which also laid more and larger eggs. The authors suggest that this might be an effective method of lowering mortality in poultry flocks. Blakemore and Dalling (1939) have also shown that resistant flocks can be developed.

From these and other experiments it would appear that the earlier practice of not breeding from survivors of an outbreak was unsound. The introduction of fresh stock from sources reputed to be free from the disease probably resulted in a lowering of resistance in the next generation and may have partially accounted for the increase in mortality experienced throughout the country. Controlled inbreeding from carefully selected survivors would probably have been a sounder procedure.

Under natural conditions an outbreak is probably determined by the degree of infection to which a flock is exposed in conjunction with its genetic constitution with reference to inherited resistance. De Ome (1943) has shown experimentally that at a given level of susceptibility the incidence is increased as the level of exposure increased, and that at a constant level of exposure the incidence was greater as the level of susceptibility increased. He deduced that resistance depended on numerous genetic factors, and that it could probably be raised to a high level.

In the light of our present knowledge it would appear that control and prevention may best be achieved by a careful selection of the breeding pen, discarding members whose progeny have shown evidence of the disease but retaining pen-sisters whose offspring have remained healthy, together with a strict isolation of young stock during the first few weeks of life: the use of fresh ground for rearing purposes or where that is impracticable recourse to the intensive system during the critical period.

The possibility of therapeutic measures of control must not be overlooked as a recent publication by Asplin (1944) gives particulars of preliminary experiments with drugs of the sulphonamide series. It was found that these drugs, when given in drinking water or food, prevented the development of typical lesions of the acute disease previously described, which results when material from fowl paralysis cases is injected intraperitoneally into susceptible young chicks. In all, 138 chicks were injected with 18 strains of virus and no cases developed. In control chicks, 101 cases developed out of 117 inoculated. Sulphadiazine, sulphamezathine and sulphathiazole gave the best results.

This work opens up a new approach to the disease and the results of further experiments are awaited with interest.

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Weekly Wisdom

". . . the important change with which Weston's name will always be associated is the introduction of a new rotation of crops, founded on the field cultivation of roots and clover. As Brillat-Savarin valued a new dish above a new star, so Arthur Young regards Weston as 'a greater benefactor than Newton.' He did indeed offer bread and meat to millions. Whether Weston had visited Flanders before 1644 *is uncertain. . . ."*—Lord Ernle, *English Farming, Past and Present.*

and a single thorax containing only two lungs greatly spent up as though each side had developed its own dilations. The abdominal cavity was single and contained only the organs of a single foetus with a uterus. The intestines were rather difficult to follow, but no doubt exists in my mind that they were the viscera of only one lamb. From my findings it appears that the cephalic ends of the embryonic discs had remained separate or perhaps there may have been some splitting of cells of the cephalic end without the complete splitting being carried caudally. This could be effected in a single embryo due to some mechanical or chemical influence. The other explanation is the twin development as stated, although the latter condition is more common."

Veterinary Education and Research at Cambridge

(Contributed)

The important references to veterinary education at Cambridge University, made by Dr. T. S. Hele on the occasion of his installation for a second year as Vice-Chancellor, have recently been noted in *The Veterinary Record*.[1] The inauguration of undergraduate veterinary courses at Cambridge has long been the subject of negotiation, and on several occasions has appeared imminent, but the necessary provisions have still to be made. By suitable choice of subjects, an undergraduate who reads for both parts of the Natural Sciences Tripos may, of course, claim certain exemptions from the R.C.V.S. examinations, and in this way a small percentage of entrants to the veterinary schools is formed from Cambridge graduates. Altogether, however, the total of Cambridge graduates on the R.C.V.S. register is still fewer than 50, while the exemptions permitted never make up completely for the time spent in taking the B.A. degree.

In 1929 Professor J. B. Buxton made an eloquent appeal[2] for the transference of the Royal Veterinary College to Cambridge. His suggestions—as many have cause to regret—were not accepted, with the ultimate result that the College was rebuilt on the Camden Town site. That it was rebuilt on a generous scale, thanks largely to the devotion of Sir Frederick Hobday, is irrelevant to the main issue. In the meantime a project for the initiation of a veterinary course in Cambridge, embracing the first three years of the curriculum, was prepared. As a result of friendly negotiations between the R.C.V.S. and the University authorities what appeared to be a satisfactory scheme was devised, but owing to the recall of the Loveday Committee its implementation was placed in abeyance.

The recommendations of the Second Loveday Report include the establishment at Cambridge of a Veterinary School teaching the whole course. There are some who contend that this proposal is less satisfactory than that contained in the earlier report, by which the clinical years would have been spent away from Cambridge. It is now generally accepted that if the standard of teaching and research in the clinical and pre-clinical subjects is to reach the highest possible level there must be integration and close personal contact between the two groups of teachers. Further, much emphasis is laid on the necessity of establishing a continuity of outlook and approach in the pre-clinical and clinical years. It would seem obvious that these *desiderata* cannot be achieved unless there are facilities for taking the whole five-year course at any one centre, and unless most of the pre-clinical teachers are veterinary surgeons who have the necessary training and interest to collaborate with their clinical colleagues. On the other hand, one of the objections to the institution of a full course embracing the vocational subjects is a doubt as to whether the area of Cambridge is likely to provide adequate clinical material comparable to that available in the areas surrounding the existing schools, although seemingly not utilised to the full at the present time.

In university life autonomy and isolation are two very different concepts. The Institute of Animal Pathology at Cambridge appears to have suffered unduly through being denied the former and subjected to the latter. Despite these handicaps its contributions to research have been considerable, and individual members of its staff have played an important part in the teaching of agricultural students in particular. Whatever veterinary scheme should be inaugurated at Cambridge, it is to be hoped it will be accompanied by the creation of an autonomous Faculty Board or its equivalent. In both research and teaching veterinarians will be unable to make their best contribution while they are subservient to agriculturists. This must not be taken to imply that there should not be the greatest possible co-operation between agricultural and veterinary workers, or that relationships between the two should be anything but the most cordial. The system by which veterinary services and research are subjected to agricultural control is, however, outmoded, and it is agriculture itself which suffers most in the centres in which it exists. Veterinary science covers a wider field than veterinary pathology and bacteriology, and this fact will be more generally appreciated in Great Britain when flourishing university veterinary schools are responsible not only for the education of future members of the profession but also for the conduct of fundamental research into the physiology and anatomy—in the wider senses of the words—of domestic animals, and for the maintenance of proper units for the study of clinical medicine and animal husbandry aspects.

When that brilliant scientist and teacher, John Barlow, was working in Dick's old school at Edinburgh he gained a great reputation in University circles. One candid friend in the University expressed his regret "that a man so richly endowed intellectually, so accomplished in many sciences, and so gifted as a teacher, had so unworthy a field for the exercise of his powers."

For many years this was typical of the general attitude in universities and medical schools, but despite such discouragement devoted and gifted men continued to study veterinary science. The recent speech of Mr. Hudson[3], as well as that of the Vice-Chancellor, make it clear that these early veterinarians are at last reaping their reward. The Government and the universities now recognise the importance of veterinary studies and are willing to give them full support. We should be failing these early pioneers who achieved so much under such adverse conditions if we did not do everything in our power to hasten the day when veterinary studies at all centres will achieve full university status.

In Dr. Hele, himself a medical man and biochemist, the profession has much reason to believe that it has a firm friend. In this his second and final year of office, therefore, we look forward not only to the cessation of hostilities in Europe, with all the stimulus which that will entail to the carrying out of reforms in education as a whole, but also to the inauguration at Cambridge of a veterinary school which will be a lasting source of satisfaction both to the University and to the profession.

1 *Vet Rec.*, 1944, **56**, p. 404.
2 *Vet. Rec.*, 1929, **41** (N.S.9), pp. 1000-1001.
3 *Vet. Rec.*, 1944, **56**, p. 389.

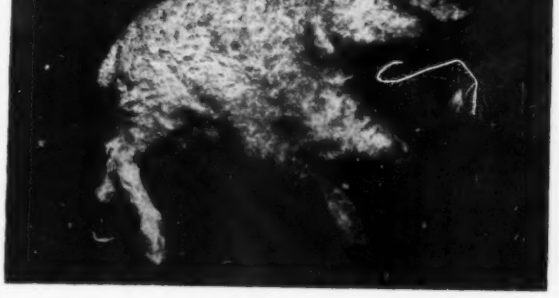
CLINICAL COMMUNICATION

A Freak Lamb

JAMES NISBET, M.R.C.V.S.,
Forfar, Angus

During the Spring I was consulted by a client regarding a Border Leicester gimmer which he was unable to lamb.

On vaginal examination the presentation of the lamb appeared normal but traction proved ineffective. That the head and legs belonged to the same lamb was again verified by careful examination, and it was therefore decided to perform an embryotomy. The fore legs were pulled as far as possible out of the vagina and an incision made around the fetlock joints. A further incision was made up the back of each leg as far as the point of the elbow. By traction each limb was then detached at the shoulder. It was now found possible to reach the head and trace behind it where an abnormal elongated mass was felt. The head was therefore pulled out of the vagina and cut off behind the ears. The elongated mass was then found to be another head to which traction was applied and the lamb delivered. The gimmer subsequently acted as foster-mother to another lamb and appeared to suffer no ill-effects from her difficult parturition



The lamb was forwarded to Professor T. Graham, F.R.C.V.S., to whom I am indebted for the following report:—

"It is possible that twins were in the process of formation and that a fusion had taken place, being brought about secondarily by the original proximity of the complete embryonic axis.

"Often such formation as this takes place when the development is in the uterine tube and not the uterus.

"There are several explanations but none are satisfactory unless the full histories of the parents, etc., are known, and a complete examination of the uterus and the uterine tubes is made. Internal examination of the lamb showed that it was only the cranial end that represented the independence of the two individuals. There were two hearts with the individual vessels running to the heads,

(*Concluded at foot of column* 1, *previous page*)

ANNOTATION

Artificial Insemination

If one may judge from the lively and continuous correspondence which has been appearing weekly in the *British Medical Journal*, the medical fraternity are considerably perturbed over the question of artificial insemination of the human. It seems to have arisen through a woman client, attending a birth control clinic, being asked whether her husband would be willing to act as a donor for an artificial insemination panel. The lady was shocked and consulted her family doctor as to the propriety of such a request. He, writing to the *B.M.J.*, thought the question was one in which the public confidence in the medical profession was likely to be involved, especially if, without the knowledge of her husband and without legal formalities of any description, a woman visiting a doctor's consulting room could ethically be inseminated with the genes of an unknown male parent. He pronounced that the Church, having for years condemned lust without procreation, might find difficulty in pronouncing upon the question of procreation without lust; and he pleaded that a considered pronouncement from a high authority on medical ethics (such as the General Medical Council) should be made to guide the members whose privilege it would be to educate the public in this most difficult problem of human relations. He concluded, "Should we fail in this respect, we may find that the present veterinary approach to this problem may persist and discredit our humanitarian traditions."

A second correspondent made the following pertinent contribution: "Artificial insemination from a donor is called for only in a very small group of barren marriages (perhaps 2 per cent. or less of all cases seen), *i.e.*, those in which the husband is completely and irremediably sterile and the wife fertile, where adoption is unacceptable because the wife desperately wants a baby of her own, and where in consequence, the marriage may be in danger of breaking down. In such cases, with the full and written consent of the sterile husband, artificial insemination, carried out as a private arrangement between the couple and the doctor, may be the best possible solution, leaving the world at large to regard the child as the husband's. . . . Most of the requests for A.I. come from the sterile husbands themselves, anxious to make such reparation as they can to their wives for the children they cannot beget. Moreover, the wives are of the type who do not seek the easy way out of finding a 'fancy man.'

"It seems possible that there will be better and more rational selection of genes if the wife receives an A.I. from a semen donor on a carefully chosen panel than, if in her chagrin and desperation, she commits an impetuous act of adultery. . . . An adopted child carries no genes from its adopted parents whereas a child conceived as a result of an A.I. does at least carry them from one. In building up a panel of semen donors it is best to choose married men with offspring, and to select only those with a clean bill of health, a sound intelligence and a high grade of fertility. The building up of such a panel is no easy matter and places a grave responsibility on the doctor who attempts it. In this, help might well be given by such expert bodies as the Medical Research Council and the Eugenics Society.

"The legal position with regard to A.I. from a donor has not yet been defined in this country. In America where A.I. has been done for many years, it is an accepted part of legitimate medical practice in carefully selected cases; even there the legal position is still fluid. If by 'veterinary' the first correspondent had meant 'scientific,' which it is to be suspected he did *not*, it would have been a well deserved compliment to the Cinderella of the professions."

According to a further correspondent, it seems that A.I. is a new procedure which is attaining some magnitude without sufficient recognition of the fact by the profession at large. The Medical Defence Union has recently published an advisory leaflet to steer the practitioner through the shoals of possible involvement in charges of conspiracy or of adultery levelled against the couple or the donor.

The whole question has been discussed from many points of view, not only moral, legal, and religious, but also aesthetic, and the present writer felt that as such aspects had probably never entered the minds of veterinary practitioners as a whole, they might have been at a great disadvantage had they been involved in discussions on the subject with their medical and other thoughtful clients.

Writers do at least give credit to the veterinary profession as the leaders in this "new and alarming" innovation.

Hamilton Kirk.

The Smithfield Club has decided not to hold a show in 1945, but the Club will review the possibilities if circumstances should improve.

ABSTRACTS

[The Nutritive Value of Potato Protein for the Pig. Hutchinson, J. C. D., Bacon, J. S. D., Macrae, T. F., and Worden, A. N. (1943.) *Biochem. J.* **37**. 550-562. [Lister Inst., Inst. Anim. Path. & Sch. Agric., Univ. Cambridge.]]

The value of the N of potato—supplied half as fresh boiled majestics and half as commercial dried potato flakes—was compared with that of barley for supporting the growth of fattening Wessex Saddleback pigs. The comparison was made with and without the addition of varying levels of casein (1 to 6 per cent. of the diet) and the food intake of individual barley-fed pigs was equated with that of their potato-fed partners. The value of the potato N was found to be consistently inferior to that of barley N. The live weight increase per unit of digestible N and also per unit of (dry) food ingested was greater in the case of the barley-fed animals, indicating that the conversion of food into live weight was more economical in the case of barley. Casein N appeared to supplement that of barley and potatoes about equally. From carcase measurements it appeared that the potato-fed pigs were fatter for their carcase weight than the barley-fed pigs.

Digestibility trials carried out on selected animals after the termination of the fattening experiments indicated that the average values for the coefficient of (apparent) digestibility of a mixture of equal parts of potato flakes and fresh boiled potatoes was 93·7 per cent. for energy and 81·5 per cent. for total N, the corresponding figures for barley being 82·3 per cent. and 79·1 per cent. On the assumption that all the casein was digested, the digestibility of the potatoes was unaffected by admixture with casein up to 6 per cent. of the diet. No explanation could therefore be offered of the very low digestibility coefficients for potato N reported by other workers.

A. N. W.

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[A Rapid Agglutination Technique. Nagle, N., Schulze, L., and Willett, J. C. (1943.) *J. Lab. clin. Med.* **28**. 1864-1867.]

The principle of agitation, which was first applied by Kahn in 1923 to his precipitation test for syphilis, largely accounts for the speed at which the antigen-antibody reaction occurs. At the St. Louis Health Division Laboratories the principle of rapid agitation as in the Kahn test has been used with success for the past several years for the rapid agglutination test for typhoid, tularaemia, brucellosis and some other bacterial diseases. The mixture of 0·3 c.c. of antigen suspension and 0·3 c.c. of the various serum dilutions is agitated in a Kahn shaking machine (280 oscillations per minute, stroke 1·5 inches) for six minutes. A preliminary reading is taken and a report is given if the titre is above 1 : 80. The tubes are then incubated at 37° C. in a water bath for five hours and the final reading obtained. The period of five hours' incubation is necessary in the case of *Brucella abortus* in order to obtain the maximum titre.

Tables are given in which the titres obtained by the rapid method and the standard procedure of the American Public Health Association are compared. The results show agreement between the maximum titre obtained by the two methods. No rise in final titre is obtained by extending the period of incubation after shaking beyond the period of five hours which the authors recommend. The titres in the case of *Br. abortus* sera from human patients varied from 1 : 80 to 1 : 81,920, the average being about 1 : 2,560.

E. G. W.

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[Studies on the Alimentary Tract of Merino Sheep in South Africa:
VII. Fermentation in the Forestomachs of Sheep. (Quin, J. I.)
VIII. The Pathogenesis of Acute Tympanites (Bloat). (Quin, J. I.)
IX. The H-ion Concentration in the Forestomachs of Fistula Sheep under Different Experimental Conditions. (Myburgh, S. J., and Quin, J. I.)

Onderstepoort J. (1943.) **18**. 91, 113 and 119.]

Fermentation in the rumen can be studied by following the rate of disappearance of the substrate and the rate at which the intermediary or end products of fermentation accumulate. As fermentation in the rumen is associated with the production of a mixture of the lower fatty acids and of gas, the variation in *p*H of the ingesta of the rumen and the rate at which gas is produced are useful criteria in judging the speed with which fermentation is progressing, and have been used for this purpose in the investigations recorded by Professor Quin and his colleague.

Experiments, using both the *in vivo* and *in vitro* techniques, show plainly that the rate of fermentation is dependent upon the diet which in turn determines the relative balance of the microörganisms of the rumen. Fermentation is most rapid when lucerne, fed either green or as hay, is the principal foodstuff; similarly the ingesta of the rumen of sheep fed upon lucerne produces the most rapid fermentation of glucose *in vitro*. Gas production is negligible in sheep fed wheat straw or poor quality hay even after the addition of glucose, but supplementing such rations with cane sugar or maize meal increases the fermentative properties of the rumen ingesta although it never attains that of the ingesta of sheep fed lucerne.

The organisms responsible for the rapid production of gas when lucerne is the daily ration, appear to be pseudo-yeasts, for although these organisms can be seen in the ingesta of most sheep on a mixed diet they become numerous only when lucerne is fed. When separated from the ingesta by differential centrifugalisation and repeated washing these yeasts are able to produce a rapid production of gas from glucose in a manner similar to the whole rumen ingesta while the deposits containing few if any of these cells ferment glucose less rapidly.

In addition to the production of gas the pseudo-yeasts seem to be able to synthesis glycogen from glucose for they give the typical dark brown staining reaction to iodine after glucose fermentation. Certain bacteria of the rumen have a similar property in that they stain blue with iodine after the addition of glucose to the ingesta as if they had deposited starch within their cells. These iodophilic cocci appear to be in competition with the yeast-like organisms, for after a period of starvation the yeasts disappear from the rumen and on recommencing regular feeding the first organisms to reappear in quantity are the iodophilic cocci; after four or five days pseudo-yeasts again appear and quickly dominate the picture at the expense of the iodophilic cocci. Both organisms produce gas from glucose but the yeasts react more rapidly in this respect than the iodophilic cocci.

The reaction of the ingesta of the rumen in general is slightly acid, the degree depending upon the carbohydrate of the diet. Exceptions to this occur when green lucerne and veld grass hay are fed when the *pH* is on the alkaline side of neutrality.

Bloat, associated with the feeding of green lucerne, is the practical field for investigations arising from the previous work. It is easy to understand how rapid gas formation occurs when animals are grazing lucerne green, but three further factors are considered. The first of these is the speed with which animals feed on green lucerne; it is claimed that by rapid eating, significant amounts of air are swallowed which produce aerobic conditions in the rumen and allow a greater quantity of gas to be formed than if the conditions were anaerobic. The second is a period of hunger; in this case the pseudo-yeasts become depleted of glycogen and this favours excessive gas formation when feeding is resumed, particularly when the leaves are eaten, for these are rich in sugar. The third factor concerned is the presence of a saponin in lucerne which, by lowering surface tension, produces a foam in the rumen so that the gas formed cannot be removed by belching. The combination of these factors leads to rapid distension of the rumen by a fermenting, foaming mass and death is attributed to immobilisation of the diaphragm leading to asphyxia aided by obstruction to the venous return from the posterior vena cava.

[It should be noted that it has yet to be proved whether or not mechanical distension of the rumen is in itself fatal and secondly, should it prove to be so, whether death is due to mechanical obstruction or to reflex effects.]

A. T. P.

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[Marfanil and Macfanil Prontalbin. Rees, W. S., and Robinson, C. N. (1944.) *Lancet*. **246**. 627.]

These two German sulphonamide compounds, captured in the desert battles, have been investigated by the authors in the treatment of 22 cases of purulent wounds. Of the two, marfanil, a compound whose action is not influenced by the presence of p-aminobenzoic acid or pus, when applied locally gave the most satisfactory results. In the majority of cases, a definite improvement followed application and from one-third of the cases no organisms could be recovered after 4 to 12 days' treatment. The compound is non-irritant, is no more toxic than sulphanilamide, and does not destroy epithelium.

S. J. E.

SCIENTIFIC APPROACH TO FARMING

Mr. R. A. Butler, Minister of Education, speaking at the annual meeting of Essex Farmers' Union, said that in the future success would go to the country which had the most scientific approach to the problems of the land and to the individual who took most trouble to bring himself up to date by training and study.

A revolution was necessary in the attitude of the farming community to education. Besides fresh rural adventures in secondary education, he was anxious to see new experiments in junior agricultural schools in the countryside to balance junior technical schools in towns and cities.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed. They can relate to any aspect of veterinary work and where publication of the name of the enquirer is not desired, a pseudonym should be supplied, the name and address also being given.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Oesophageal Obstruction due to Sugar-beet Pulp

Q.—*I have just moved to a district where sugar-beet pulp is extensively fed to farm horses. Will you please advise me as to the recognised method of treatment of "choke" due to this cause?—E. S.*

A.—Sugar-beet pulp, especially when fed dry, is a very common cause of oesophageal obstruction in horses, and owing to a rapid increase in size of the obstructing mass due to absorption of water, considerable oesophageal distension soon occurs.

When first confronted with a suspected case of this kind, diagnosis may be confirmed by a careful and gentle attempt to pass a stomach-tube and at the same time slight pressure may be applied in an attempt to remove the obstruction. In the event of obvious resistance, however, the tube should be removed immediately. The owner should then be warned that "choke" in horses is much less urgent to relieve than a similar condition in cattle and, in fact, it may be three to four days before treatment will be successful. Hasty and severe treatment may result in a fatal outcome.

The patient should be tied in a stall and all food and edible bedding within reach should be removed. After much reluctance in the treatment of earlier cases of this kind, the writer now arranges for a patient to have continued access to drinking water. He believes that the washing and cooling effect on the buccal mucosa is appreciated by the patient and that attempts to swallow the water are beneficial in helping to remove the obstruction.

When first seen and at all subsequent visits, small doses of arecoline hydrobromide or other parasympathetic stimulants are prescribed, excessive salivation and other effects of these drugs helping to soften and move along the mass. The writer has no preference for any particular drug but uses discretion in the frequency of administration and dosage in aged patients, and if necessary combines this treatment with the hypodermic administration of strychnine or other stimulants.

At each visit slight pressure may be applied to the mass by means of the stomach-tube, but the writer prefers to reserve its use until the second or third day when, if not already relieved, the mass will have undergone some decomposition and have become softer and less likely to injure the delicate oesophageal wall, when pressure is applied. In obstinate obstruction small quantities of water or, preferably, liquid paraffin, should be lightly pumped into the mass, and if the tube is left *in situ* and the pump removed small pieces of partly decomposed pulp may be siphoned off from the mass. If the patient is given freedom of the head there is very little risk of causing an inhalation pneumonia as would at first appear.

In the writer's experience success has always ensued following the above methods, provided excessive interference has been avoided in the earlier stages, and on no occasion has it been necessary to attempt further surgical interference.

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Ruminant Digestion

Q.—*Will you please give me a physiological explanation of:—*
(1) How a calf can digest whole beans and a cow cannot?
(2) How a cow can digest whole oats when fed in the sheaf and cannot digest whole oats when fed by themselves?—"Rumen."

A.—Calves seem to like the feel of whole beans and will mouth them for sometime before finally *crushing* them and then swallowing them. (For explanation as to why cows seem unable to deal with them see reasons for oats, below.)

(2) The grains will be held in the "sheaf" and will be macerated when this is returned to be cudded. When whole oats are fed some will be crushed but most will be swallowed intact and pass directly into the rumen. Some of these will become entangled and undergo regurgitation to and maceration in the mouth, whilst the rest will separate out by virtue of their specific gravity and be swept by reticular contraction from time to time towards the last two stomachs. They will be found in the faeces practically unchanged.

Note.—The formation of the rumenal groove is dependent largely upon stimuli received in the pharyngeal region by the passage of food. Milk and water provide this stimulus in the calf. Though the former will evoke this response in animals up to three months of age, the response to water is lost after about a week. In older animals the groove can be created by drenching with such substances as common salt, sugar or sodium bicarbonate (Wester, J., (1930), *Vet. J.*, **86**, 401). Copper sulphate will bring this about in sheep, but it is less effective in the bovine.

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Coal-gas Poisoning in the Dog

Q.—*How can one recognise a case of coal-gas poisoning in the dog, and is it necessarily fatal?—"Toxic."*

A.—It is not at all infrequent for dogs or cats accidentally to turn on a gas tap. Numerous cases have been attended and usually with successful results, this depending upon the length of exposure and the rapidity with which treatment is afforded. In legal cases the diagnosis of CO poisoning may be established by a simple test. Add a few drops of a 25 per cent. solution of sodium hydroxide to 5 c.c. of blood in a test tube. If CO is present the mixture turns bright red. Normal blood turns a dirty brown. This test is conclusive long after death. The symptoms must, of course, be considered. The animal may be insensible; otherwise there is profound loss of power amounting sometimes to paralysis; muscular tremors; laboured and rapid respirations; dilated pupils; cyanosis; relaxed sphincters, and death in coma.

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Hormone Therapy in Premature Senility

Q.—*Does hormone therapy affect the normal body temperature of animals? Would it be recommended in a case of premature senility in a three-year-old male greyhound with no breeding history? The dog appears to be perfectly healthy, with the exception of looking older than his years, but lacks the little extra vitality necessary to win a race. If hormone therapy is recommended, what hormone or hormones, dosage and route of administration, do you suggest?—"Mate."*

A.—So far as the writer is aware, there is no evidence to suggest that hormone therapy affects the normal body temperature of animals.

Hormone therapy might usefully be employed in a case of premature senility in a male greyhound such as that quoted. The condition described is usually associated with a deficiency of the testicular hormones, particularly that of the interstitial tissue of the testes; it would be interesting to know if the dog in question has testicles of average size and if the penis and prepuce tend to be infantile in development.

The obvious line of treatment is the administration of a whole gland testicular preparation such as the orchic substance "emplets," five grs., put up by Parke, Davis and Co. Suitable dosage would probably be two daily during the initial stages of treatment, any improvement being maintained by a dose of one daily, or less frequently as seems necessary. These "emplets" are, of course, for oral administration.

In the writer's view, however, it would be more rational to stimulate the dog's own testicular tissue, and this can be accomplished by a minor surgical interference, *viz.*: Steinach's operation, the ligating of the vasa deferentia. This operation naturally results in mechanical sterility, but as the animal concerned does not appear to be of great potential breeding value, this may be of no account. Alternatively, the vas deferens on one side only might be ligated and this might be sufficient to produce the desired stimulation of testicular tissue, whilst leaving the animal able to breed. Improvement following Steinach's operation is usually quite marked within three months.

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Tuberculin-tested Milk: A Marketing Query

Q.—*Bearing in mind that the customer is prohibited from changing his milk ration registration, what is the position of a producer-retailer who takes out a T.T. licence; can his customers be forced to pay the extra charge for such milk, and, if not, is the bonus made up to the farmer?—H.*

A.—The Ministry of Food will favourably consider an application by a consumer wishing to buy T.T. milk to change his registration if the dairyman with whom he is at present registered is either unwilling or unable to handle this grade of milk although supplies can be made available to him.

A producer-retailer cannot force his registered customers to buy T.T. milk as such at a price higher than that charged for non-designated milk. A producer-retailer receives from the Board a bonus of 4d. per gallon for *producing* T.T. milk, whether the milk is sold as T.T. or otherwise. If he can induce his customers to purchase it as T.T. he is entitled to charge them a higher price, which has the effect of increasing his distributive margin.

There is nothing to prevent him from selling a portion of his production as T.T. milk and the remainder not, under the designation, but in respect of the latter he must not charge more than the prescribed price for ordinary milk, namely 9d. per quart. The retail prices fixed by the Ministry of Food are maximum prices and it is no offence to sell below them.

QUESTIONS IN PARLIAMENT

Bovine Tuberculosis (Vaccine Infection)

Mr. Leach asked the Minister of Health whether his Department has considered the possibility of bovine tuberculosis being caused by vaccination and that a considerable number of cases of bovine tuberculosis are notified in areas where all or nearly all the milk consumed is pasteurised milk; and what action he proposes to take to prevent the spread of this form of tuberculosis.

Mr. Willink: I am advised that medical research has produced no evidence to suggest that smallpox vaccination either causes or aggravates tuberculous infection. The source of bovine infection cannot be limited to the particular area where the disease comes to notice and its occurrence is not necessarily related to the milk supply in that area. The measures that are being taken to increase pasteurisation or other efficient heat-treatment of milk throughout the country are the most effective means of combating bovine tuberculosis.

. . . . . .

Foot-and-Mouth Disease (Vaccine)

Mr. Turton asked the Minister of Agriculture the name of the vaccine produced in this country that is under trial in the Argentine with a view to rendering cattle immune from foot-and-mouth disease; and by whom the vaccine is being produced in this country.

Mr. T. Williams: Small quantities only of the vaccine, which for convenience has been called foot-and-mouth disease (crystal violet) vaccine, have been produced in this country. It is produced at the Foot-and-Mouth Disease Research Station at Pirbright solely for experimental purposes and is prepared by treating with crystal violet dye blood from affected animals. Advice as to its method of preparation has been given to the Argentine authorities.

Mr. Turton asked the Minister of Agriculture whether he is able to give any information about the experiments with anti-foot-and-mouth vaccine conducted, in September and October, 1943, at La Salamanca, Alberdi; how many animals were vaccinated; how many of those vaccinated subsequently caught foot-and-mouth disease; and how many unvaccinated animals in this establishment suffered from foot-and-mouth disease.

Mr. T. Williams: I have no information at all about the experiments carried out at La Salamanca except that I have heard that some private trials with a vaccine prepared by Dr. W. M. Crofton were undertaken in 1943 and at other times in various herds in Alberdi and elsewhere in South America. So far as I am aware there is no reason, either as a result of the trials or otherwise, for reopening the long standing and fully considered question of Dr. Crofton's claims for his vaccine.

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Civil Service (Scientific Staff, Recruitment)

Mr. Price asked the Chancellor of the Exchequer what is the present policy of the Government with regard to recruitment of scientific staff to established posts in the Civil Service during the reconstruction period; what steps he proposes to take to ensure that only the most suitable and best qualified personnel are established under this scheme; and whether the Scientific Advisory Committee or other appropriate bodies will be consulted in the matter.

Sir J. Anderson: Investigation has been carried out into the conditions of service, pay and prospects of Government scientific staff, in close consultation with the Scientific Directors in Departments, and proposals have now been made which, I believe, will result in the recruitment of highly qualified personnel during the reconstruction period. These proposals are at present under discussion between the Treasury and the Institution of Professional Civil Servants.

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Civil Service Head

Miss Ward asked the Prime Minister whether, in view of the present policy of the Government regarding the powers of the head of the Civil Service, he will issue a further circular bringing up to date those of 1919 and 1920.

The Prime Minister: No, Sir. The 1919 and 1920 Circulars still hold good. Following a Debate in another place, a full Government statement on the position was made there on November 25th, 1942. There is no need for a new Circular to the Service, where the arrangements are well understood by those whose duty it is to work them.

Mr. W. J. Brown: Is it not anomalous that the headship of the Civil Service should rest in the person of the Permanent Secretary to the Treasury, and would it not be more appropriate that it should rest with a properly constituted Civil Service Commission?

The Prime Minister: I have nothing to add to the statement which I have made, which was to the effect that the Government adhere to the Circulars sent out in 1919 and in 1920.

Miss Ward: Is the right hon. Gentleman aware that, in another place, a very sharp distinction was drawn between the head of the Foreign Office and the head of the Civil Service, and would he be good enough to place those two Circulars in the library of the House?

The Prime Minister: There is, no doubt, a distinction to be drawn between the two offices which my hon. Friend has mentioned. They are obvious and well known distinctions. As to the two Circulars, I will certainly arrange for them to be placed in the tea-room or wherever it is desired.

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The list of persons constituting the Central Advisory Council for England, recently announced by the Minister of Education, included that of Professor J. A. Scott Watson, Chief Education and Advisory Officer, Ministry of Agriculture.

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Grasslands (Research)

Sir J. Mellor asked the Minister of Agriculture why he decided that a review, including cost accounts, of the operations, or of selected operations, of the Grassland Improvement Station, near Stratford-on-Avon, should not be issued during the war.

Mr. Hudson: Owing to the need for devoting very large areas to the reclamation of land for growing crops urgently required for food production and for using larger areas than had been originally anticipated for research and experimental purposes, it has not proved possible to keep cost accounts on the lints originally contemplated, and the available accounts would give little or no guidance on the economic results of establishing leys on heavy clay land. In the circumstances I decided that no useful purpose can be served by publishing any accounts or review of the Station's operations at this stage.

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Dogs (Quarantine Regulations)

Sir T. Moore asked the Minister of Agriculture what are the regulations governing the sending home or the bringing home of pet dogs by Service men overseas.

Mr. T. Williams: The regulations which govern the importation of dogs into Great Britain apply to all dogs, whether they belong to Service men or other persons. Those regulations require that every dog brought into Great Britain from anywhere outside the British Isles shall, on landing, be placed and kept, at the expense of its owner, in approved quarantine premises for a period of six months.

Mr. R. Morgan asked the Secretary of State for War, since many overseas Servicemen wish to bring home pet dogs, what steps are being taken to bring to their notice the condition of six months' quarantine and the consequent expense.

Sir J. Grigg: An Army Council Instruction was published in 1940 giving full information about bringing dogs into this country. A further instruction was issued on December 2nd of this year ordering units to repeat the original instruction in their unit orders.

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Parrots (Psittacosis)

Sir T. Moore asked the Minister of Health whether any restrictions are placed on the bringing home of parrots by Service men or by men in the Mercantile Marine in view of the danger from psittacosis.

Mr. Willink: Men serving in the Forces or the Merchant Service are subject to the Parrots (Prohibition of Import) Regulations, 1930, which make it in general illegal to bring parrots into this country because of the risk of psittacosis.

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Condemned Meat (Animal Food)

Mr. R. Morgan asked the Minister of Food in view of the scarcity of knacker-meat as food for dogs and cats, whether he will set aside for the feeding of animals some of the meat condemned in markets as unfit for human consumption.

Colonel Llewellin: Meat condemned in Government slaughter-houses as unfit for human consumption is used after the necessary and proper treatment for the production of feeding stuffs for cattle, pigs and poultry, and for essential industrial purposes. A proportion of the meat meal so produced is supplied to manufacturers of

dog foods. Therefore practically the whole of the condemned meat is already being used in the manner sought by my hon. Friend.

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MEDICAL RESEARCH (EXPENDITURE)

Sir E. GRAHAM-LITTLE asked the Lord President of the Council whether he can give any estimate of current annual expenditure on all branches of medical research in this country, including expenditure by Government establishments, including Service and Supply Departments and the Colonial Office, on physiology, pharmacology and pharmaceutical preparations, biochemistry, pathology, bacteriology, nutrition, ophthalmology, ophthalmic optics, clinical medicine and surgery, dentistry, public health and all other questions involved in the promotion of health and prevention of disease; and what approximate proportion of such research is financed or controlled directly by the Medical Research Council.

Mr. ATTLEE: It is not possible to give any comprehensive estimate of current annual expenditure on medical research in this country, as investigations in this broad field of enquiry are financed not only out of public moneys but also by private funds administered by universities and hospitals and by independent research institutes and organisations. No complete information is available about these latter resources, and only a relatively small part of the total expenditure from funds of private origin is controlled by the Medical Research Council.

As regards public funds, the main item is the expenditure of the Medical Research Council, amounting to about £290,000 in the current financial year; of this £250,000 is provided by the Parliamentary grant-in-aid and the remainder from contributions and repayments from various Government Departments and sundry credits. The total expenditure directly allocated to medical research through other Government channels is at present about £100,000 per annum, mainly on special investigations by the Services into war problems. This takes no account, however, of research undertaken by the members of medical services, with the Armed Forces and otherwise, in addition to the other duties for which they are primarily employed; nor does it take account of research done by institutions in receipt of Government grants for mainly educational work.

ADVERTISERS' ANNOUNCEMENT

'VELUFAX' brand Obstetric Lubricant (*Veterinary*) is a bland, pleasant-smelling cream specially designed for application to the hands and arms prior to obstetrical manipulations, rectal or vaginal examinations, etc. It possesses antiseptic and deodorant properties, and is highly economical in use, a single application being sufficient to maintain an efficient lubricating film for a considerable period. The cream is made with a water-soluble base and can be easily and quickly removed with *cold* water and without the use of soap. It is issued in pots of approximately 3½ oz. (sufficient for 35 to 40 average applications) at 3s. (plus 4½d. Purchase Tax), subject to professional discount. Further information is obtainable from Burroughs Wellcome & Co., 12, Red Lion Square, London, W.C.1.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 30th.—Whole-day Conference of the Nutrition Society, at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 11 a.m.

[Attention is drawn to the notice, amended as to Chairman, times of papers, and openers of discussions, appearing in our Forthcoming Meetings column.]

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PERSONAL

Birth.—SMITH.—On December 17th, 1944, at the Maxwell Nursing Home, Edgware, to Winifred E. Smith, M.R.C.V.S. (*née* Fox), wife of F. W. A. Smith, M.R.C.V.S., Oundle, a son.

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REPRESENTATION OF SCIENCE IN PARLIAMENT

In a recent issue of *The Times*, Mr. M. Philips Price, M.P., Deputy Chairman of the Parliamentary and Scientific Committee, draws attention to what he describes as the alarming news that Dr. A. V. Hill, Secretary of the Royal Society, is not standing for Parliament again. It is vital, he says, that science should have a greater impact upon legislation and administration and in the present Parliament there are already insufficient scientists, engineers, or persons with wide scientific contacts. His committee has tried to make Parliament more "science-minded," but this work will inevitably make slower progress without the help of a certain number of M.P.s and peers who have themselves enjoyed scientific training and experience.

PUBLICATION DELAYS: THE AFTERMATH OF AN "INCIDENT"

As intimated in our last issue, the Editorial Committee feels that some explanation is called for of the delay in publication of certain important material, the pending appearance of which either has been referred to in these columns, or may justifiably be anticipated by our readers on other grounds. This includes a verbatim report of the Proceedings of the enquiries held by Select Committees of both Houses of Parliament into the Bill promoted by the People's Dispensary for Sick Animals of the Poor, an enlarged number of the *Record* prepared in commemoration of the Centenary of the Royal College of Veterinary Surgeons, and a considerable number of reports of meetings of Council, R.C.V.S., and of meetings of Divisions, N.V.M.A.

With the bulk of this material in their hands our printers have advised us that, in consequence of the inability of some of their staff to return to duty even now following enemy action in the summer, they find it impossible temporarily to keep pace with the work involved additional to the publication of the weekly issue.

We are sure that our readers will share to the full the sympathy felt by the Editorial Committee with our printers in the circumstances in which they find themselves placed, and will extend their indulgence to both in the inevitable delay which must ensue in the publication of the material mentioned, remaining assured that every effort will be made to reduce that period to the minimum. It should be added that the restrictions imposed by Paper Control preclude the possibility of employing alternative means of publication.

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SAFEGUARDING AGRICULTURAL LAND

Mr. R. S. Hudson, Minister of Agriculture, addressing the Council for the Preservation of Rural England, said that during the past five years 800,000 acres of agricultural land—most of it the best land—had been taken for airfields, factories, defence works and other purposes arising out of the war. This was one of a series of post-war problems affecting agriculture. Housing would be the major problem—hundreds of thousands wanted quickly for town and country. Sites must be found—in a great many cases on agricultural land—and it would be his concern to see that sites wherever possible should be on land which could be released without undue harm to agriculture. More often than not the better agricultural land, usually flat and well drained, was considered most suitable for building, or at any rate the cheapest for the purpose; it drew housing authorities and builders like a magnet. In many cases he believed they could be diverted without harm either to housing or agriculture.

This was not primarily his job. Planning was for the Minister of Town and Country Planning, housing for the Minister of Health. He was only concerned to point out that by adopting such methods they could save large tracts of rural Britain. Mr. Hudson urged that they should get into the habit of regarding rural England as dynamic, not static—not a dehydrated countryside preserved as a museum piece, but a place where people worked and lived and where one of our biggest industries was carried on. The lovely English countryside we knew was a man-made, not a natural, thing.

Professor Patrick Abercrombie, who presided, said that the beauty of the countryside was very dependent on a prosperous agriculture. It was essential to do as little damage as possible to agricultural land, and he hoped the old practice of choosing land for development irrespective of its agricultural value was a thing of the past. He pointed to the danger of a short-sighted policy of selling rather than restoring requisitioned land, since its restoration would probably cost more than its capital value.

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ANIMAL DISEASES LEGISLATION IN EIRE

The *Irish Independent* reports that Dr. Ryan, Minister of Agriculture, speaking in the Seanad on the second stage of the Diseases of Animals Bill, said its purpose was to bring former legislation into line with modern conditions. It dealt with the methods of compensating owners for animals slaughtered because of foot-and-mouth outbreaks. He expected to have to introduce further legislation, as the committee investigating post-war agriculture had brought in an interim report. When the occasion arose it might be possible to bring in a measure codifying the Acts dealing with diseases of animals.

Mr. M. J. Ryan was of opinion that legislation by reference always meant more work for lawyers and more expense for the public. This was amending an amending Act, and it was another proof of the need for codification of the law relating to the diseases of animals and poultry.

Mr. T. C. Kingsmill Moore said that while it was impossible to codify all the laws a first practical step would be to endeavour to make each Bill something in the nature of a consolidatory Bill.

Mr. L. Duffy urged the codification of the laws in relation to the activities of the Department of Agriculture.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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IDENTIFICATION OF VACCINATED CALVES

Sir,—In connection with the proposed Ministry's scheme for vaccination of calves against contagious abortion, it has occurred to me that there should be some means of identifying vaccinated animals, especially as the scheme is as yet a voluntary one.

When the owner sends the number of calves to be vaccinated into the Divisional Office, could he not be supplied with that number of ear-tags, bearing an official Ministry stamp? This would enable those farmers who buy "bulling heifers" to determine whether or not they had been vaccinated.

I note in the abstract from the *Canadian Journal of Comparative Medicine* appearing in this week's *Record* that some such system of ear-marking is employed in Canada, and I consider it could be profitably introduced into this country.

Yours faithfully,

"Melverne," JOHN D. DUNN.
West Hill, Wadebridge, Cornwall.
December 16th, 1944.

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EQUINE LUNG TISSUE REQUEST

Sir,—I am hoping to make a study into the nature of a respiratory disease occurring in farm workers which is attributed to exposure to mouldy hay and is known as "farmer's lung." I understand that the condition of "broken wind" or "the heaves" in horses is also believed to be associated with exposure to dusty and mouldy hay.

In order to determine the nature of the condition, it would be desirable to make pathological studies of the lungs, but fortunately, though it is an incommoding disorder, it is not a fatal one, so that it is unlikely that human material of this type would be forthcoming. On the other hand, it may be that material from horses would throw some light on the human condition as they are both regarded as being associated with exposure to mouldy hay.

Accordingly, I should be grateful if veterinary surgeons examining animals with this condition which are to be slaughtered, could provide me with portions of lung tissue. The material I would desire would be large portions of lung tissue which should be fixed in a solution of 10 per cent. formalin and also portions of lung unfixed for bacteriological and mycological examination; the latter could be quite small (about 2 in. square) and to be of any value should be despatched in a clean glass bottle as soon as possible after removal from the body. The portions of lung for microscopic examination should be fixed in formalin solution for a few days and then despatched wrapped in lint in a tin box. Needless to say I should be only too pleased to repay postage and any other expenses.

It is believed that this comparative study might throw valuable light on what is apparently quite a significant hazard of farming.

Yours faithfully,

A. H. T. ROBB-SMITH, M.D.,
Pathological Department, *Director of Pathology.*
Radcliffe Infirmary, Oxford.
December 12th, 1944.

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THE DEMOBILISED VETERINARY SURGEON

Sir,—Flight-Lieutenant Wooldridge, in his letter in your issue of November 4th, has raised a matter of the utmost importance to all of us at present in the Services. As one of the members he mentioned who are serving in the R.A.V.C. in our professional capacity, I cannot but agree with him that what experience we are acquiring will be of limited value only in general practice—limited as it is in most cases to the preservation of health and treatment of comparatively minor ailments of equines only—in my case mules. Some members who are serving in Base Veterinary Hospitals will undoubtedly have the advantage of developing a very admirable surgical technique, but even they are in the minority. We shall all, I am afraid, leave the Service with very hazy memories of the diseases and handling of the other species which have now overshadowed the horse in importance in the average practice, especially cattle.

It is considered that the inevitable gradualness of demobilisation, aggravated by the probably large requirements of the Japanese campaign, will render any "refresher course" system too cumbersome to be contemplated, as it would of necessity have to be available to each man within a reasonably short time of him finding himself free.

It was my experience that more really useful practical experience could be acquired in a given time by accompanying an experienced practitioner on his rounds than by the most excellent of lectures. Furthermore, I can carry a supply of text-books wherever I go and so keep up to date in the theoretical aspect, but no one has ever learned, or re-learned, to calve a cow or express a corpus luteum from a book or lecture. It is this manipulative skill and the confidence gained from familiarity with the problem at hand—usually summed up as "experience"—which I fear we shall most lack.

The objections he raised to this "paid student" system are admittedly real. But surely there are still practitioners left in the profession with sufficient public, or professional, spirit to be relied upon to tolerate us and to provide us once again with the benefits of their greater experience without cashing in on our eagerness to find our civilian feet again by using us solely as dispensers or kennelmen, or by starting again the vicious circle of undercutting the salaries of the immediately post-war graduates.

Can we rely on the enormously increased demands on our services such as have been voiced in Parliament and promised in the Loveday Report? Or shall we inevitably find that the salaries for experienced assistants now offered in your journal of £600 to £700 per annum, drop immediately we return, to the level some were forced to accept four years ago. Given the co-operation of a few unselfish practitioners I see no reason why we should not be enabled to re-equip ourselves as useful civilian veterinary surgeons without causing any hardship to anyone.

Yours faithfully,

JOHN PYBUS, Capt., R.AV.C.
786 Coy., R.A.S.C. (Pack Trans.),
Central Mediterranean Forces.
December 10th, 1944.

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"HIGHER STATUS FOR THE VETERINARY PROFESSION"

Sir,—No one has yet replied to the letter of Mr. A. W. Read in your issue of December 2nd. Perhaps the reason is that the profession thought no notice need be taken of it. May I be allowed to point out to him that members of the profession are aware that there are at their disposal veterinary laboratories with well-established reputations, staffed by veterinary surgeons whose qualifications and integrity are well known. They prefer to rely on those services, rather than those of a man they have never heard of, and of whose qualifications they know nothing.

Yours faithfully,

23, Queen's Gate Gardens, THOMAS LISHMAN.
London, S.W.7.
December 13th, 1944.

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VETERINARY SURGEON'S TITLE

Sir,—As a means of distinguishing a Registered Veterinary Surgeon from a quack, and of enlightening the general public as to the status of the profession, may I suggest that we adopt the prefix "Doctor" to our names as is the custom in other countries?

Yours faithfully,

4, Church Street, Llangefni, Anglesey. T. HUGHES ELLIS.
December 18th, 1944.

DISEASES OF ANIMALS ACTS 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Nov. 16th to 30th, 1944...	7	13	—	8	73
Corresponding period in—					
1943 ...	11	2	1	7	20
1942 ...	23	41	1	19	13
1941 ...	8	—	—	19	28
Total Jan. 1st to Nov. 30, 1944	170	169	7	214	1,338
Corresponding period in—					
1943 ...	264	17	8	202	501
1942 ...	331	642	27	240	425
1941 ...	370	260	17	188	1,042

NOTE.—The figures for the current year are approximate only.
*** Excluding outbreaks in Army Horses.**

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at November 30th, 1944, was as follows:

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
4,354	8,455	4,034	16,843